

WHAT IS CLAIMED IS:

1. A method for producing polyunsaturated fatty acids from diatomaceous *Chaetoceros gracilis*, comprising the step of applying at  
5 least one growth-limiting factor to a diatomaceous *Chaetoceros gracilis* culture at the end of the exponential growth phase, causing growth arrest of said culture and production and stocking by algae in culture of polyunsaturated fatty acids.
2. A method for producing polyunsaturated fatty acids from  
10 diatomaceous *Skeletonema costatum*, comprising the step of applying at least one growth-limiting factor to a diatomaceous *Skeletonema costatum* culture at the end of the exponential growth phase, causing growth arrest of said culture and production and stocking by algae in culture of polyunsaturated fatty acids.
- 15 3. The process of claim 1 or 2, wherein the growth-limiting factor is silicate deprivation.
4. The process of claim 1 or 2, wherein the growth-limiting factor is a nutrient deprivation.
- 20 5. The process of claim 1, 2, 3 or 4, wherein more than one growth-limiting factor is applied.
6. The process of claim 1, 2, 3, 4 or 5, wherein the growth limiting factor is applied once the culture has reached a concentration of at least  $10^7$  cells/mL.